

NOTES ON TYPES OF *TOXOMERUS* (DIPTERA: SYRPHIDAE)¹

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ABSTRACT: Types of the genus *Toxomerus* (Diptera: Syrphidae) from the American Museum of Natural History were examined. The genitalia of some of these types were removed and similarities not previously known were revealed. Comparisons were made with Ecuadorean specimens in the Western Illinois University collection. These types and Ecuadorean specimens were studied in a general taxonomic survey (Gerdes, 1974). Abdominal patterns and genitalia not previously figured in the literature were drawn.

DESCRIPTORS: Diptera, Syrphidae, *Toxomerus pichincae* n. sp., from Pichincha, Ecuador.

1. Holotypes of *Toxomerus idalius* (Hull) and *Toxomerus eurydice* (Hull)

The genitalia of these holotypes appeared identical and these types may represent one species. Both species were first described by Hull (1951), with the description of *T. idalius* occurring first.

Genitalia of *Toxomerus idalius* holotype (Figure 1).--In side view superior lobe with dorso-basal extension, forked distad; short baso-lateral protuberance; bristles along distal margin and shorter bristles along ventral margin. In dorsal view each stylus with convex lateral and medial margins, which form a distal blunt tip. Triangular process two-thirds length of styli when measured from a line connecting the bases of the styli; in side view there appears below the stylus a medial, triangular, blunt projection ventrad. In dorsal view epandrium fairly rectangular and three-fourths length of styli. In dorsal view ejaculatory hood with distal tip narrowed, then laterally flared into a rounded end with a small distomedial depression; in side view distal end similarly narrowed, then expanded into a bulbous end.

Abdominal pattern of *Toxomerus idalius* holotype (Figure 2).--Posterior part of first segment and base of second segment black; posterior part of second segment shining black; third and fourth segments each with reddish brown posterior fascia and dark brown medial spots; fifth segment with oval black spot.

2. Holotype of *Toxomerus antiopae* (Hull)

This species was first described by Hull (1951).

Genitalia of *Toxomerus antiopae* holotype (Figure 3).--In dorsal view each superior lobe with long baso-lateral protuberance reaching almost to lateral margin of stylus. In side view styli closely pressed down on superior lobes and ejaculatory hood, making a clear side view impossible. In side view distal and ventral margins of superior lobe

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covered with bristles. In dorsal view each stylus with convex lateral margin; fairly straight disto-medial margin; scattered hairs over dorsal surface; a few bristles on disto-ventral surface. In dorsal view epandrium almost same length as styli. Triangular process one-third length of styli. In dorsal view ejaculatory hood slightly concave on distal margin; in side view rounded disto-dorsal tip leading into a small lateral flap ventrad on each side; larger ventral flap on each side.

Abdominal pattern of *Toxomerus antiopae* holotype (Figure 4).—First segment almost completely shining black. Second segment black basad and mediad except for narrow yellow medial fascia; shining black on posterior one-third of segment. Third and fourth segments each with basal dull black fascia, medially incised; posterior fasciae of same segments dull black on anterior part and medially incised, but shining black near posterior margin. Fifth segment with large oval black spot mediad and black subbasal areas; posterior black fascia mainly shining black but narrowly separated from surrounding margin of segment.

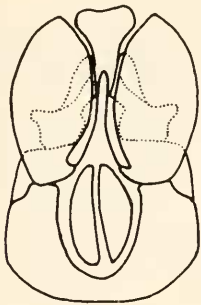
3. Holotype and allotype of *Toxomerus sylphus* (Hull) and holotype of *Toxomerus ultimus* (Hull)

The allotype of *T. sylphus* and the holotype of *T. ultimus*, both females, appeared to have identical genitalia and may represent the same species. *Toxomerus sylphus* was first described by Hull (1943b) and *T. ultimus* by Hull (1951). *Toxomerus nasutus* Sack was first described by Sack (1941) and may also belong to the same species, although the types were not available. The *T. sylphus* abdominal pattern was drawn by Hull (1943a). The *T. sylphus* holotype abdomen has the lateral margins curled ventrad and highly distorted fourth and fifth segments. The allotype of *T. sylphus* appears to be covered with a white fungal growth, making comparison difficult. However, the genitalia of the *T. sylphus* allotype and the female specimens from Ecuador referred to the species *T. nasutus* appeared identical; the abdominal patterns were similar.

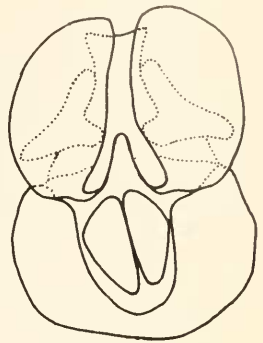
Female genitalia of *Toxomerus nasutus* (Figures 8-10).—In ventral view hypogynium widest mediad; slightly flared on basal tips; very small medial depression on distal margin. In side view dorsal valve half length of ventral valve, which is straight on dorsal margin and convex on ventral margin. In ventral view genital plate with medial depression on basal margin; disto-lateral margins concave. In dorsal view epigynum with rounded lateral and distal margins, the latter very slightly produced into a distomedial projection; transverse sclerotized spot on distal half of dorsal surface; basal margin straight except at tips; in side view dorsal margin straight except for small hump over sclerotized spot.

Female specimens from Ecuador examined.—All were collected by E. Velastiqui, a professional collector; identified by the author; and stored in the Western Illinois University collection. Banos, 47, 23-VII-1963 to 15-V-1965; Chaupi, 1, 2-VIII-1963; Conquista, 1, 19-V-1967; Naguazo, 1, 27-VIII-1963; Napo Oriente, 1, 9-V-1967; Obitagua, 1, 8-III-1965; Obitahua, 5, 11-III-1965 to 30-III-1965; Rio Blanco, 2, 1 on 20-VII-1963, 1 on 21-V-1965; Rio Negro, 5, 14-III-1965 to 20-VI-1965; Runtun, 15, 15-VII-1963 to 7-V-1965; Salado, 2, 1 on 3-VIII-1963, 1 on 4-VIII-1963; Sanqay, 2, 10-II-1966; Santana, 8, 1 on 22-V-1965, 7 on 2-V-1966; Sarayaco, 1, 13-II-1965; Sasayaso Oriente, 5, 4 on 18-I-1965, 1 on 28-II-1965; Yunguilla, 1, 4-V-1966.

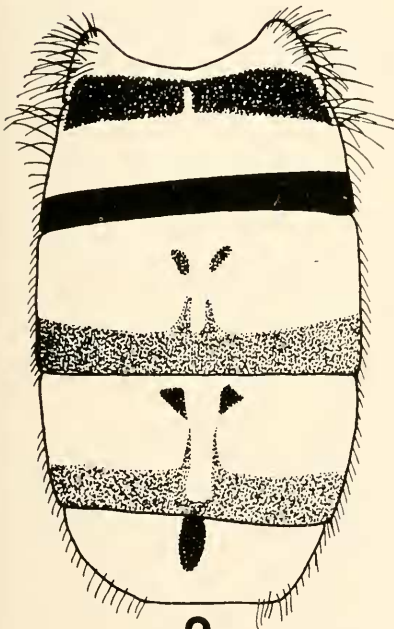
Fig. 1. Genitalia of *Toxomerus idalius* (Hull) holotype, dorsal view. Fig. 2. Abdomen of *Toxomerus idalius* (Hull) holotype, dorsal view. Fig. 3. Genitalia of *Toxomerus antiopae* (Hull) holotype, dorsal view. Fig. 4. Abdomen of *Toxomerus antiopae* (Hull) holotype, dorsal view.



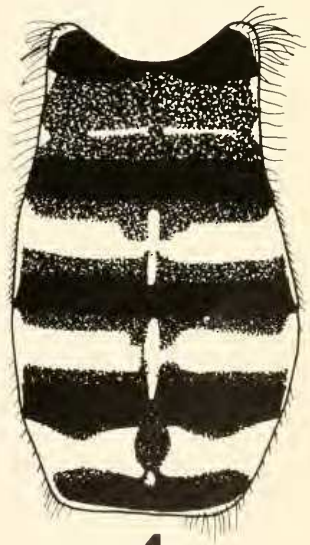
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4. Holotypes of *Toxomerus productus* (Curran) and *Toxomerus cyrillus* (Hull) and allotype of *Toxomerus cyrillus* (Hull)

The genitalia of the holotypes, both males, appeared identical and may represent the same species. *Toxomerus productus* was first described by Curran (1930) and *T. cyrillus* by Hull (1951). The *T. productus* abdominal pattern was drawn by Hull (1943a).

These three types are alike in having the humeri, margins of the scutum, propleural spots, dorsal sternopleural spots, and posterior mesopleural spots, all yellow. The face is slightly shorter than the antennae. Both males have a dark brown subapical band on the posterior femur and a medial band on the posterior tibia. The female has a light brown subapical band on the posterior femur and a subbasal band on the posterior tibia. The color pattern of the *T. cyrillus* holotype is very obscure and cannot be easily compared to the *T. cyrillus* allotype, which is well-marked. Four males and eleven females from Ecuador, referred to the species *T. productus* in the following description, were found to have the same genitalia as the types of *T. cyrillus* but showed considerable diversity of the abdominal patterns.

Male genitalia of *Toxomerus productus* (Figures 5-7).—In side view superior lobe with short dorsal extension, forked distad; disto-ventral margin convex and bordered by bristles; a few very long bristles on baso-ventral curved margin. In dorsal view each stylus gradually wider distad; each with blunt distal triangular tip; scattered short hairs on dorsal surface; more close-spaced short hairs on disto-ventral surface. Triangular process three-fourths length of styli. In side view ejaculatory hood with evenly concave dorsal margin; narrowed neck on dorso-distal extension, which enlarges and becomes bulbous at distal end; on each side very slightly developed lateral flaps below bulbous end; larger ventro-basal flaps. Dorsal and ventral keels on sustentacular apodeme. In side view ejaculatory sac and ejaculatory apodeme narrow. Chitinous box with distal hooked extension inside ejaculatory hood.

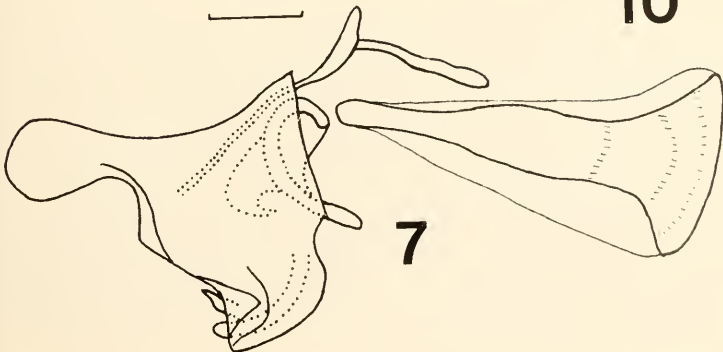
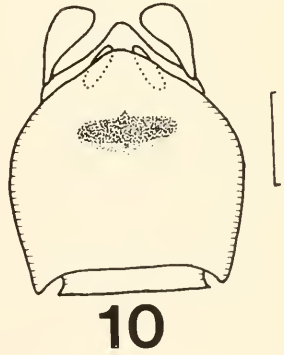
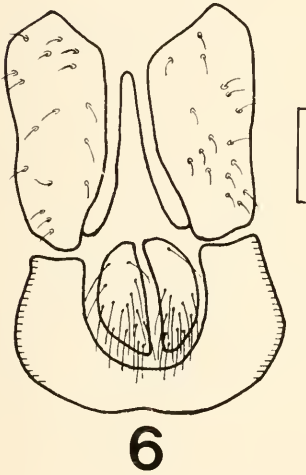
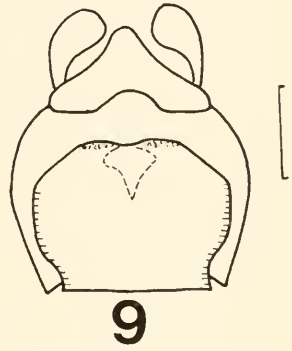
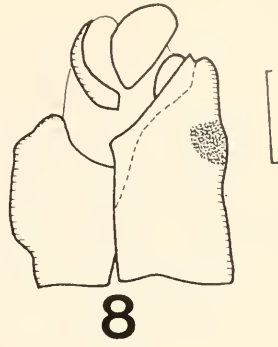
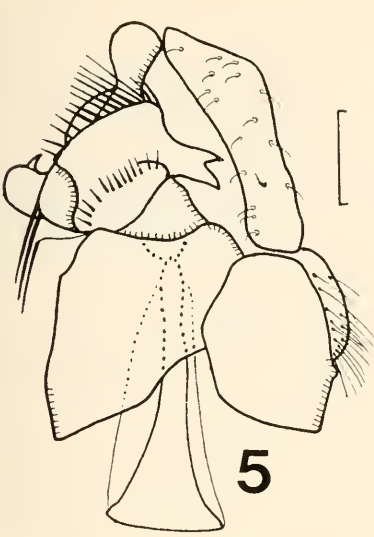
Female genitalia of *Toxomerus productus* (Figures 11-13).—In ventral view hypogynium slightly constricted basad and gradually constricted past middle toward distal margin, where each side forms a triangular blunt projection with a medial depression between these two projections. In side view dorsal valve half length of ventral valve, which is fairly straight on dorsal margin and more convex on ventral margin. In ventral view genital plate with acute basomedial indentation; straight disto-lateral margins meeting in a blunt tip. In dorsal view epigynium with continuously rounded lateral and distal margins; baso-medial transverse sclerotized spot; in side view dorsal margin slightly convex.

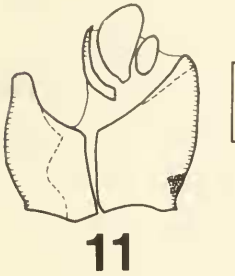
Specimens from Ecuador examined.—All were collected by E. Velastiqui; identified by the author; and stored in the Western Illinois University collection. Males: Napo Oriente, 1, 1-V-1964; Obitahua, 3, 18-III-1965; Sanqay, 1, 10-III-1966; Sarayaco, 1, 1-III-1965; Sasayaso, 1, 28-II-1965. Females: Banos, 2, 1 on 3-III-1965, 1 on 16-III-1965; Obitagua, 1, 8-III-1965; Obitahua, 3, 18-III-1965; Rio Negro, 2, 27-III-1965; Runtun, 2, 3-V-1965; Sasayaso Oriente, 2, 28-II-1965.

5. Holotype of *Toxomerus brevifacies* (Hull) and allotype of *Toxomerus productus* (Curran)

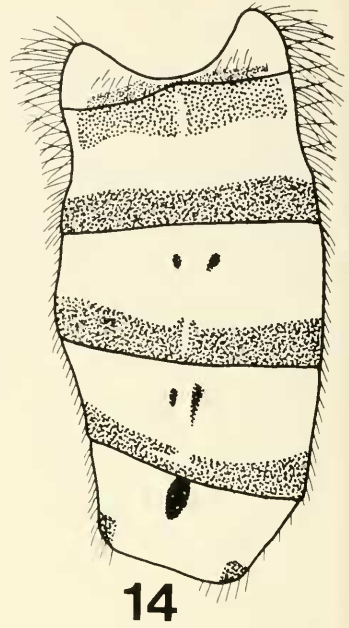
These two types may represent the same species. *Toxomerus brevifacies* was first described by Hull (1943a). Both types have a face as long as the antennae; dark brown, white pilose, third antennal segments; yellow humeri, scutellar margins, dorsal sternopleural spots, and posterior mesopleural spots; yellow, slightly infuscated scutella with long black hair; and posterior yellow femora and tibiae with black hair. The thorax

Fig. 5. Male genitalia of *Toxomerus productus* (curran), right side, scale line = 0.17 mm. Fig. 6. Male genitalia of *Toxomerus productus* (Curran), dorsal view, scale line = 0.17 mm. Fig. 7. Male genitalia of *Toxomerus productus* (Curran), axial system, scale line = 0.12 mm. Fig. 8. Female genitalia of *Toxomerus nasutus* Sack, right side, scale line = 0.17 mm. Fig. 9. Female genitalia of *Toxomerus nasutus* Sack, ventral view, scale line = 0.17 mm. Fig. 10. Female genitalia of *Toxomerus nasutus* Sack, dorsal view, scale line = 0.17 mm.

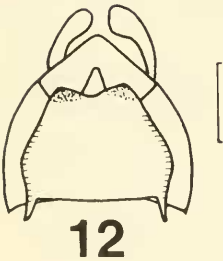




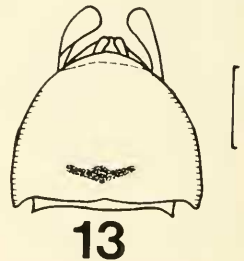
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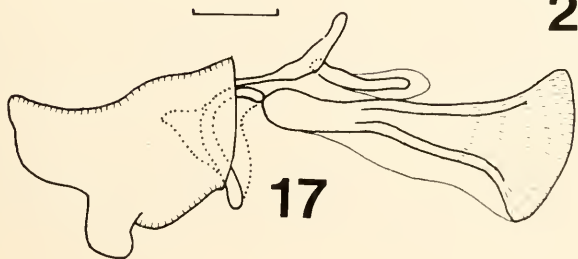
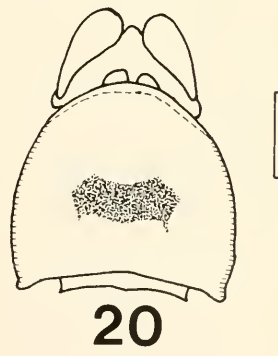
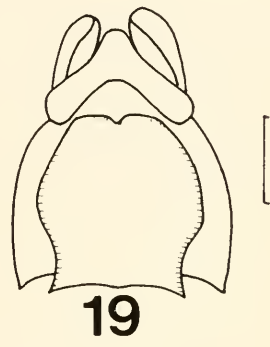
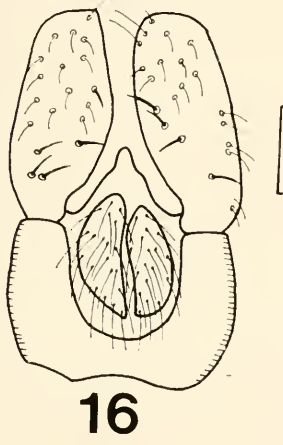
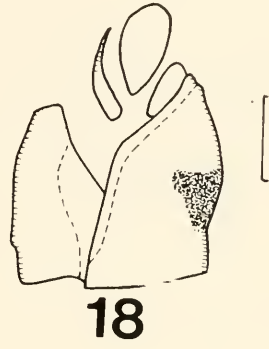
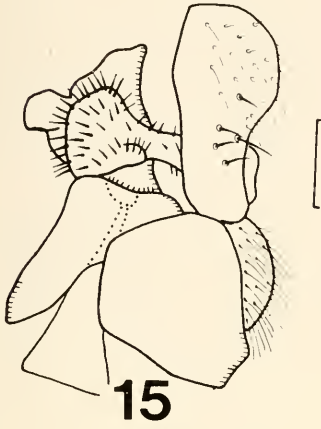
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Fig. 11. Female genitalia of *Toxomerus productus* (Curran), right side, scale line = 0.17 mm. Fig. 12. Female genitalia of *Toxomerus productus* (Curran), ventral view, scale line = 0.17 mm. Fig. 13. Female genitalia of *Toxomerus productus* (Curran), dorsal view, scale line = 0.17 mm. Fig. 14. Abdomen of *Toxomerus brevifacies* (Hull) holotype, dorsal view.

Fig. 15. Male genitalia of *Toxomerus brevifacies* (Hull), right side, scale line = 0.17 mm. Fig. 16. Male genitalia of *Toxomerus brevifacies* (Hull) dorsal view, scale line = 0.17 mm. Fig. 17. Male genitalia of *Toxomerus brevifacies* (Hull), axial system, scale line = 0.12 mm. Fig. 18. Female genitalia of *Toxomerus brevifacies* (Hull), right side, scale line = 0.17 mm. Fig. 19. Female genitalia of *Toxomerus brevifacies* (Hull), ventral view, scale line = 0.17 mm. Fig. 20. Female genitalia of *Toxomerus brevifacies* (Hull), dorsal view, scale line = 0.17 mm.



of the holotype is faded and appears to have a yellow propleural spot; the allotype has no such spot. However, of the twenty-five males from Ecuador whose genitalia agreed with the holotype, a spot was present on three. Sixteen females from Ecuador were found whose genitalia agreed with the allotype; these are referred to the species *T. brevifacies* in the following description. The abdominal patterns of the two types were similar but showed some variation. The abdominal drawing of the *T. brevifacies* holotype (Figure 14) is slightly asymmetric since the abdomen is twisted on the left posterior side.

Abdominal pattern of *Toxomerus brevifacies* holotype (Figure 14).—Posterior margin of first segment light brown but not reaching lateral edges. Second segment with wide, basal, light brown fascia, medially incised and not reaching lateral edges; complete posterior brown fascia. Third and fourth segments each with brown posterior fascia and darker medial spots, which are unconnected to the posterior fascia. Fifth segment with basal black spot and brown posterior corner spots.

Male genitalia of *Toxomerus brevifacies* (Figures 15-17).—In side view superior lobe with long dorsal extension, forked distad; rounded ventro-distal and ventral margins; baso-medial lateral protuberance; short bristles on ventro-distal and ventral margins; smaller bristles and hairs continuing up distal margin; scattered hairs on lateral surface; a few hairs on dorsal extension and lateral protuberance. In side view stylus wide; in dorsal view truncate distad; sparse scattered hairs dorsad; short scattered hairs on disto-ventral surface. Triangular process one-third length of styli. Epandrium three-fourths length of styli. In dorsal view ejaculatory hood with small medial projection on distal margin, which flares slightly on each side as a lateral lobe; in side view ventro-medial lobes and rounded ventro-basal keel. Sustentacular apodeme with no dorsal keel and small ventral keel. In side view ejaculatory apodeme narrow but slightly wider distad, with peripheral area unsclerotized distad. In side view ejaculatory sac narrow. Chitinous box with distal extension inside ejaculatory hood.

Female genitalia of *Toxomerus brevifacies* (Figures 18-20).—In ventral view hypopygium constricted basad; flared slightly at basal tips; with small disto-medial notch. In side view dorsal valve half length of ventral valve, which is slightly convex on dorsal margin and more convex on ventral margin. In ventral view genital plate concave basad; with slightly concave disto-lateral sides; with rounded distal end. In dorsal view epigynum concave on basal margin with continuously rounded lateral and distal margins; large oval to rectangular spot mediad, which is slightly concave on distal edge; in side view slight hump extending from basal end of spot to near distal margin.

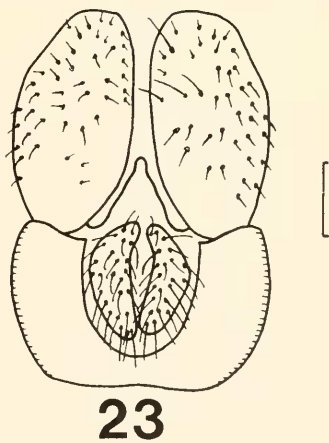
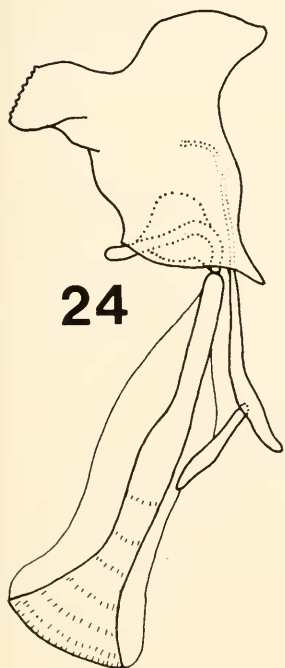
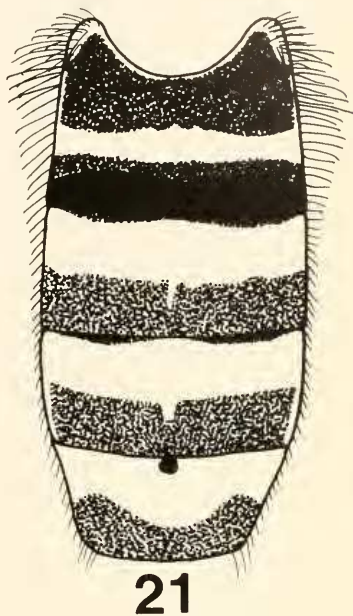
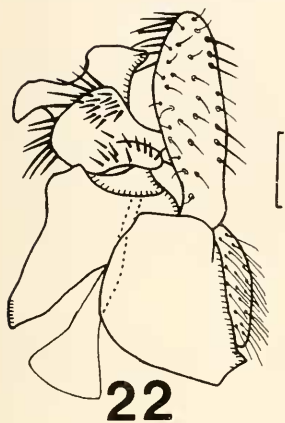
Specimens from Ecuador examined.—All were collected by E. Velastiqui; identified by the author; and stored in the Western Illinois University collection. Males: Banos, 17, 24-VII-1963 to 3-VII-1965; Chaupi, 1, 25-VIII-1963; Conquista, 3, 19-V-1967; Obitagua, 3, 2 on 8-III-1965, 1 on 18-III-1965; Rio Blanco, 2, 1 on 21-VII-1963, 1 on 10-IV-1965; Rio Negro, 5, 27-III-1965 to 10-VI-1965; Runtun, 2, 18-VIII-1963; Sanqay Oriente, 1, 10-III-1966; Sarayaco, 1, 17-III-1965; Sasayaso Oriente, 2, 28-II-1965; Topo, 1, 5-V-1965; Ulvilla, 4, 15-V-1965. Females: Abitagua Oriente, 1, 23-VI-1967; Banos, 5, 27-VII-1963 to 15-V-1965; Chaupi, 1, 25-VIII-1963; Conquista, 2, 19-V-1967; Naguazo, 2, 26-VIII-1964; Rio Negro, 4, 1 on 27-III-1965, 3 on 6-IV-1965; Runtun, 1, 5-III-1965; Santana, 1, 22-V-1965; Sasayaso, 2, 18-II-1965; Ulvilla, 4, 15-V-1965.

6. Holotype of *Toxomerus ecuadoreus* (Hull)

Twelve specimens from Ecuador were found with genitalia identical to the holotype, a male. This species was first described by Hull (1943a).

Abdominal pattern of *Toxomerus ecuadoreus* holotype (Figure 21).—First segment mainly charcoal colored except narrowly on lateral edges. Second segment with wide

Fig. 21. Abdomen of *Toxomerus ecuadoreus* (Hull) holotype, dorsal view. Fig. 22. Male genitalia of *Toxomerus ecuadoreus* (Hull), right side, scale line = 0.17 mm. Fig. 23. Male genitalia of *Toxomerus ecuadoreus* (Hull), dorsal view, scale line = 0.17 mm. Fig. 24. Male genitalia of *Toxomerus ecuadoreus* (Hull), axial system, scale line = 0.12 mm.



basal fascia of same color except narrowly on lateral edges; posterior fascia same color anteriorly but shining black posteriorly. Third segment with two thin basal strips and wide posterior fascia, both black; small medial incision in posterior fascia. Fourth segment similar except posterior fascia does not reach lateral edges. Fifth segment with tiny baso-medial spot and large posterior fascia, both reddish black. The holotype possessed no spots on the third and fourth segments, but several specimens with identical genitalia showed varying degrees of development of spots.

Male genitalia of *Toxomerus ecuadoreus* (Figures 22-24).--In side view superior lobe with dorsal projection, forked distad; baso-medial lateral protuberance; ventral margin covered with bristles; scattered hairs on lateral surface and baso-medial lateral protuberance. In dorsal view styli set close together; each with scattered hairs on dorsal surface and longer hairs on distal one-third of ventral surface. Triangular process one-third length of styli. Epandrium three-fourths length of styli. In dorsal view ejaculatory hood concave on distal margin; in side view concave on dorsal margin, which is produced into a rounded disto-dorsal end, which is flared moderately on each side into a lateral flap; with larger ventral flaps that have pitted lateral surfaces and serrate ventral margins. In side view sustentacular apodeme with ventral keel larger than dorsal keel. In side view ejaculatory sac narrow. In side view chitinous box with rounded medial extension inside ejaculatory hood.

Male specimens from Ecuador examined.--All were collected by E. Velastiqui; identified by the author; and stored in the Western Illinois University collection. Aloag, 7, 23-VI-1967 to 27-VI-1967; Banos, 1, 19-VIII-1963; Obitagua, 1, 8-III-1965; Rio Blanco, 1, 20-VII-1963; Rio Negro, 4, 1 on 27-III-1965, 3 on 6-IV-1965; Runtun, 5, 15-VIII-1963 to 7-V-1965.

Conclusion.---It is hoped that this paper will encourage further and more comprehensive comparisons of the genitalia of *Toxomerus*. Little work has been reported on the genitalia of this genus for which over 100 species have been reported in the literature. Doubtless several species have been incorrectly designated but more work is needed to reach reliable conclusions.

ACKNOWLEDGEMENTS

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